FIG. 1

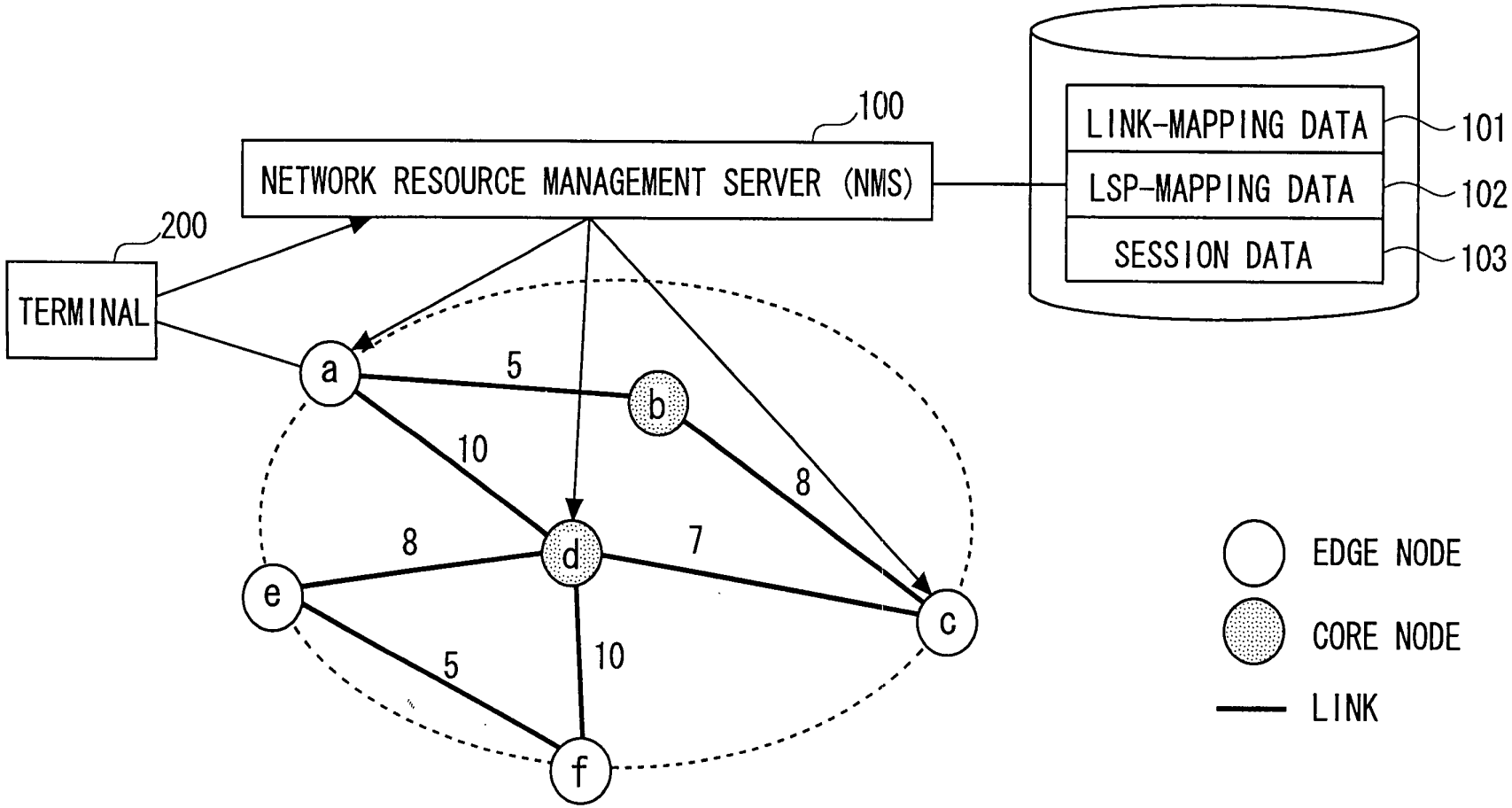

100
NETWORK RESOURCE MANAGEMENT SERVER (NMS)
LINK-MAPPING DATA
LSP-MAPPING DATA
SESSION DATA
101
102
103
200
TERMINAL
a
b
c
d
e
f
5
10
8
8
7
5
10
EDGE NODE
CORE NODE
LINK

FIG. 2

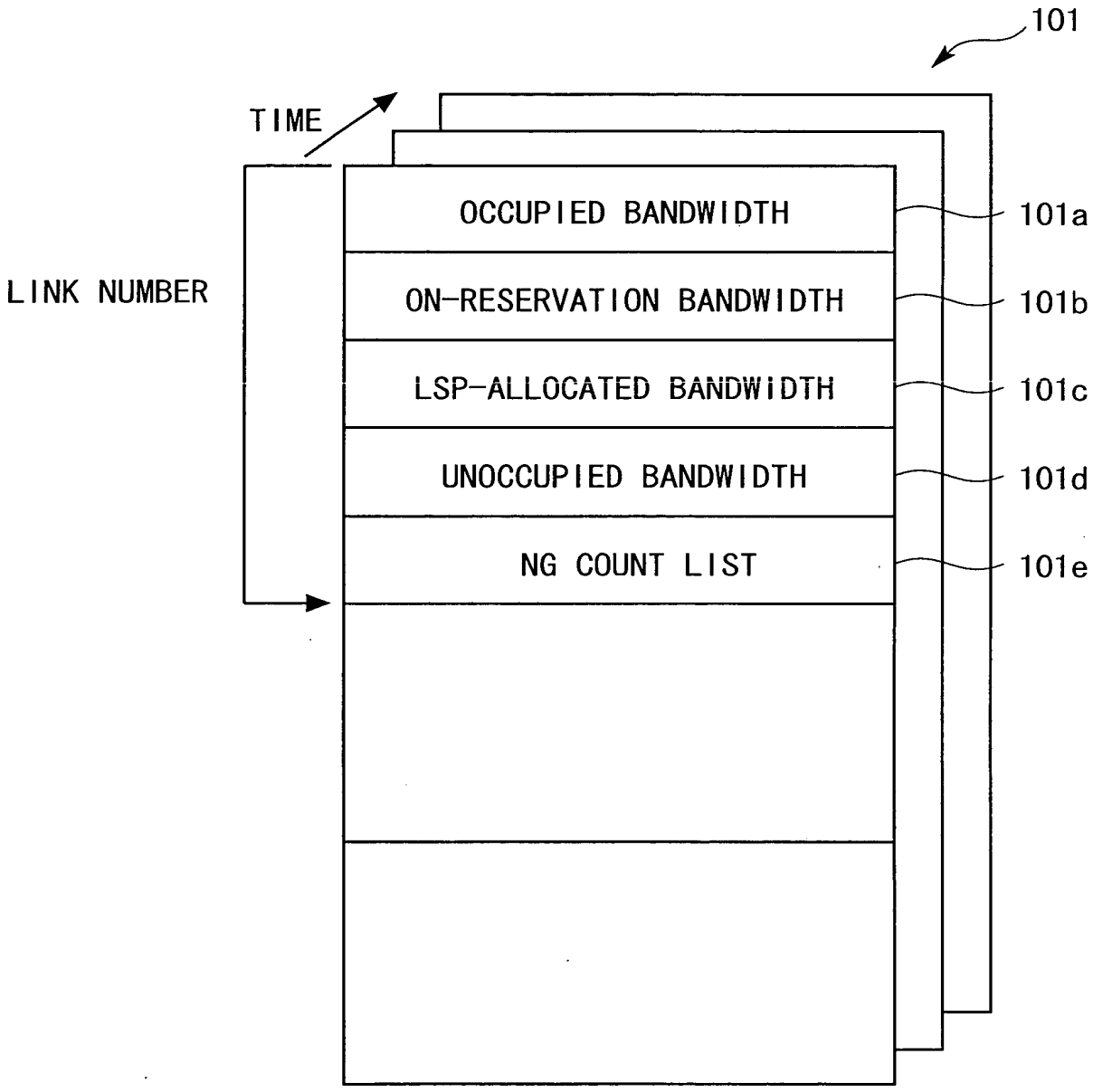

101
TIME
LINK NUMBER
OCCUPIED BANDWIDTH
ON-RESERVATION BANDWIDTH
LSP-ALLOCATED BANDWIDTH
UNOCCUPIED BANDWIDTH
NG COUNT LIST
101a
101b
101c
101d
101e

FIG. 3

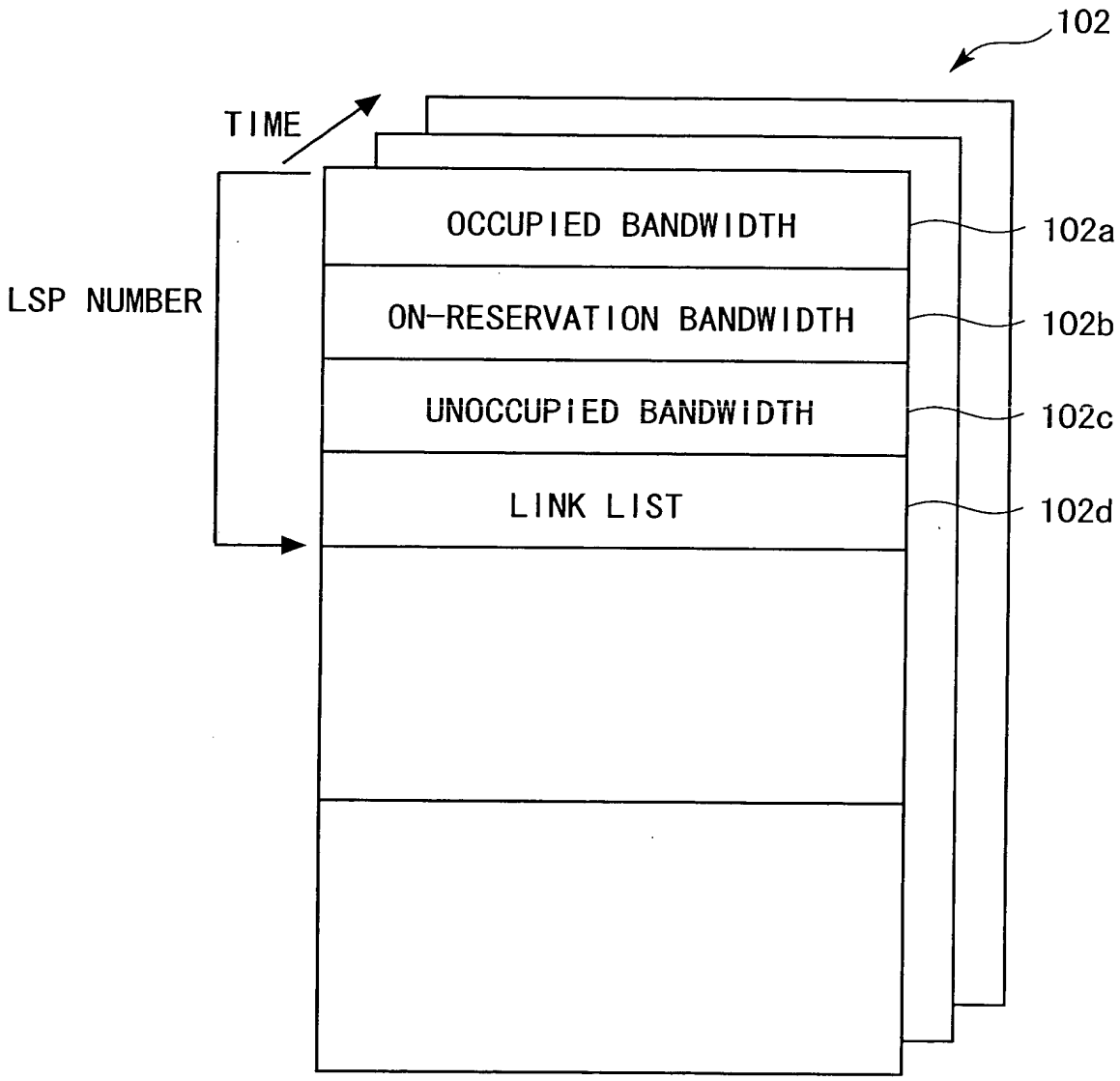

102
TIME
LSP NUMBER
OCCUPIED BANDWIDTH
ON-RESERVATION BANDWIDTH
UNOCCUPIED BANDWIDTH
LINK LIST
102a
102b
102c
102d

FIG. 4

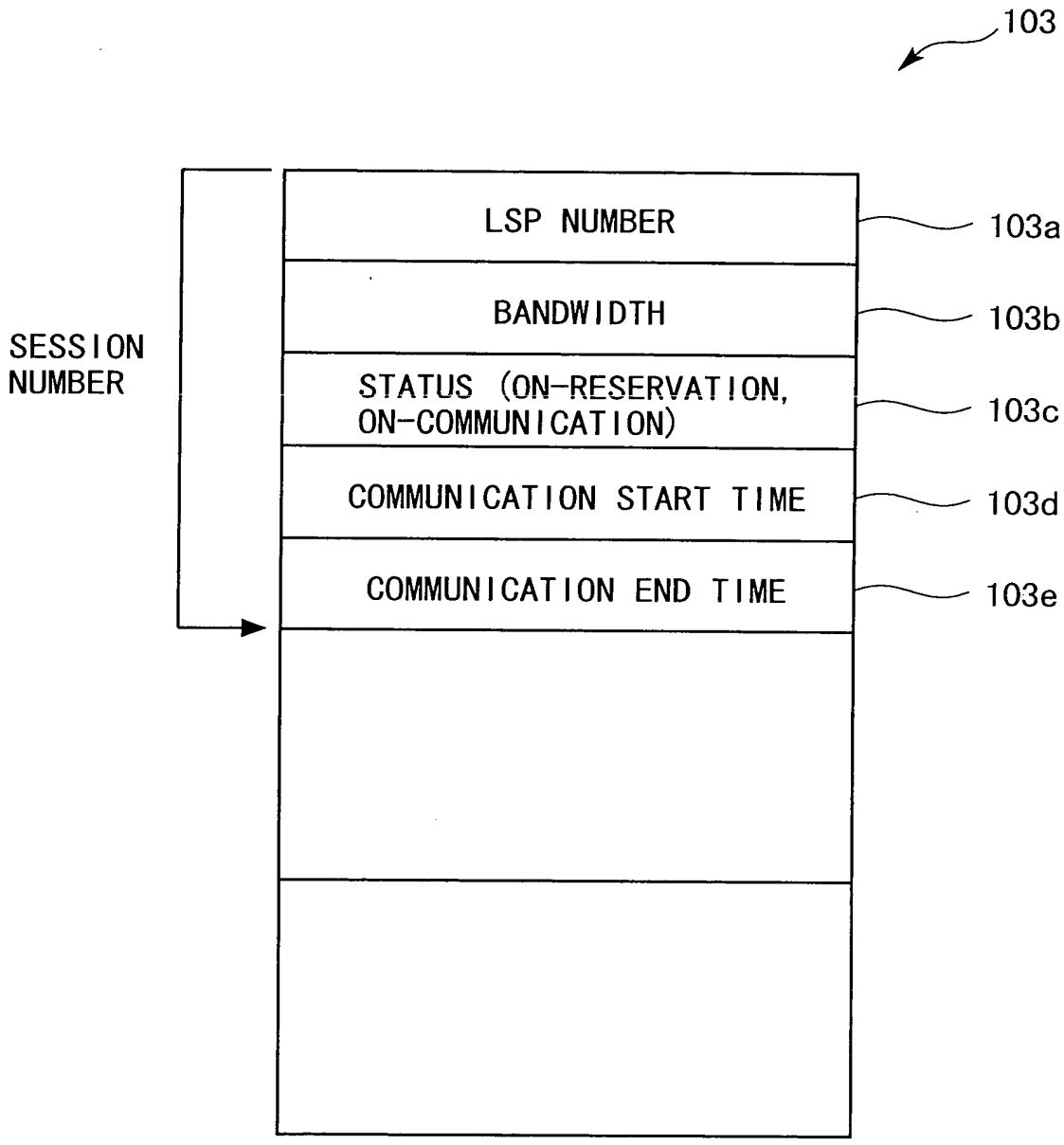

103
SESSION NUMBER
LSP NUMBER
103a
BANDWIDTH
103b
STATUS (ON-RESERVATION, ON-COMMUNICATION)
103c
COMMUNICATION START TIME
103d
COMMUNICATION END TIME
103e

FIG. 5

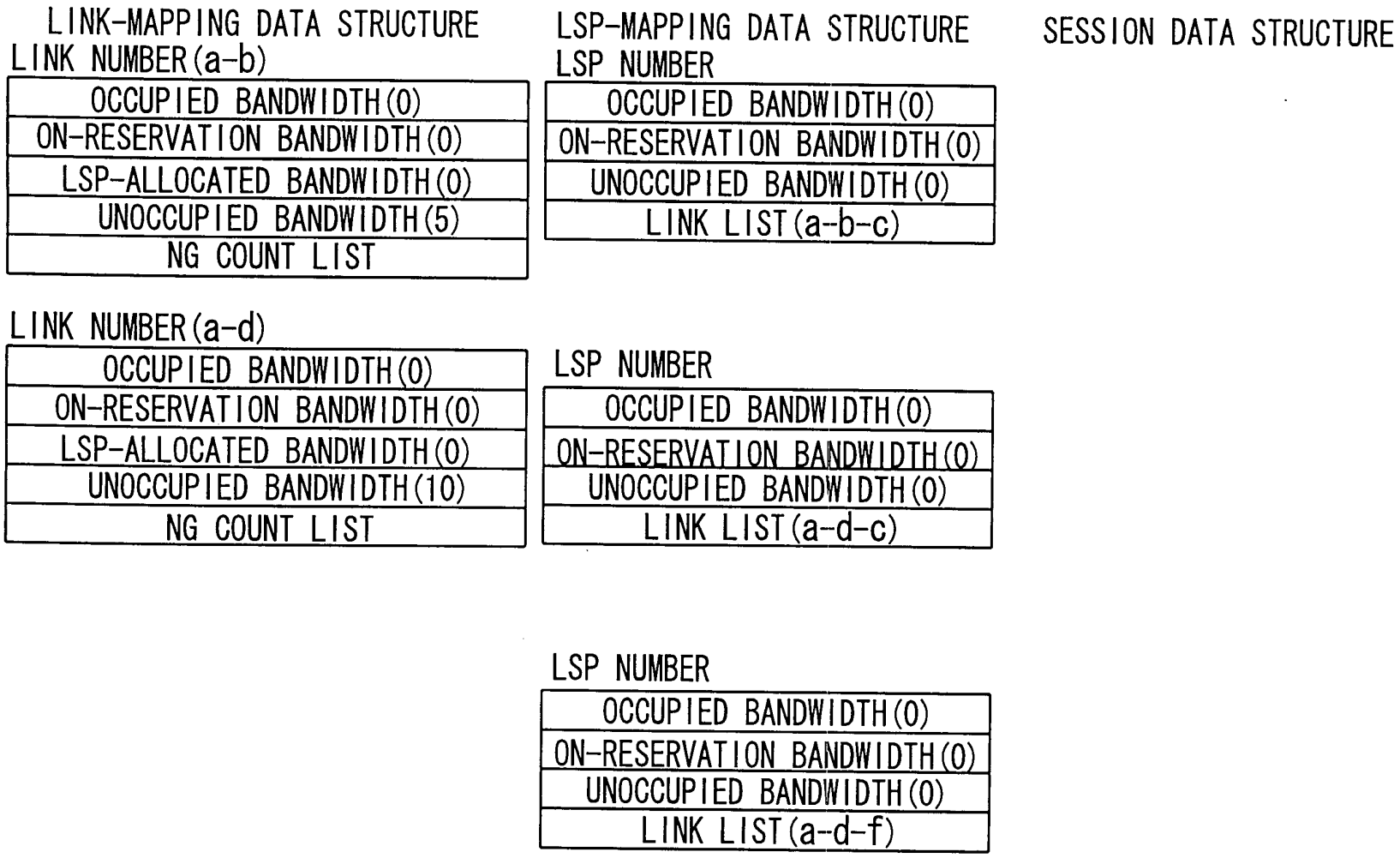

LINK-MAPPING DATA STRUCTURE
LINK NUMBER(a-b)
OCCUPIED BANDWIDTH(0)
ON-RESERVATION BANDWIDTH(0)
LSP-ALLOCATED BANDWIDTH(0)
UNOCCUPIED BANDWIDTH(5)
NG COUNT LIST
LINK NUMBER(a-d)
OCCUPIED BANDWIDTH(0)
ON-RESERVATION BANDWIDTH(0)
LSP-ALLOCATED BANDWIDTH(0)
UNOCCUPIED BANDWIDTH(10)
NG COUNT LIST
LSP-MAPPING DATA STRUCTURE
LSP NUMBER
OCCUPIED BANDWIDTH(0)
ON-RESERVATION BANDWIDTH(0)
UNOCCUPIED BANDWIDTH(0)
LINK LIST(a-b-c)
LSP NUMBER
OCCUPIED BANDWIDTH(0)
ON-RESERVATION BANDWIDTH(0)
UNOCCUPIED BANDWIDTH(0)
LINK LIST(a-d-c)
LSP NUMBER
OCCUPIED BANDWIDTH(0)
ON-RESERVATION BANDWIDTH(0)
UNOCCUPIED BANDWIDTH(0)
LINK LIST(a-d-f)
SESSION DATA STRUCTURE

FIG. 6

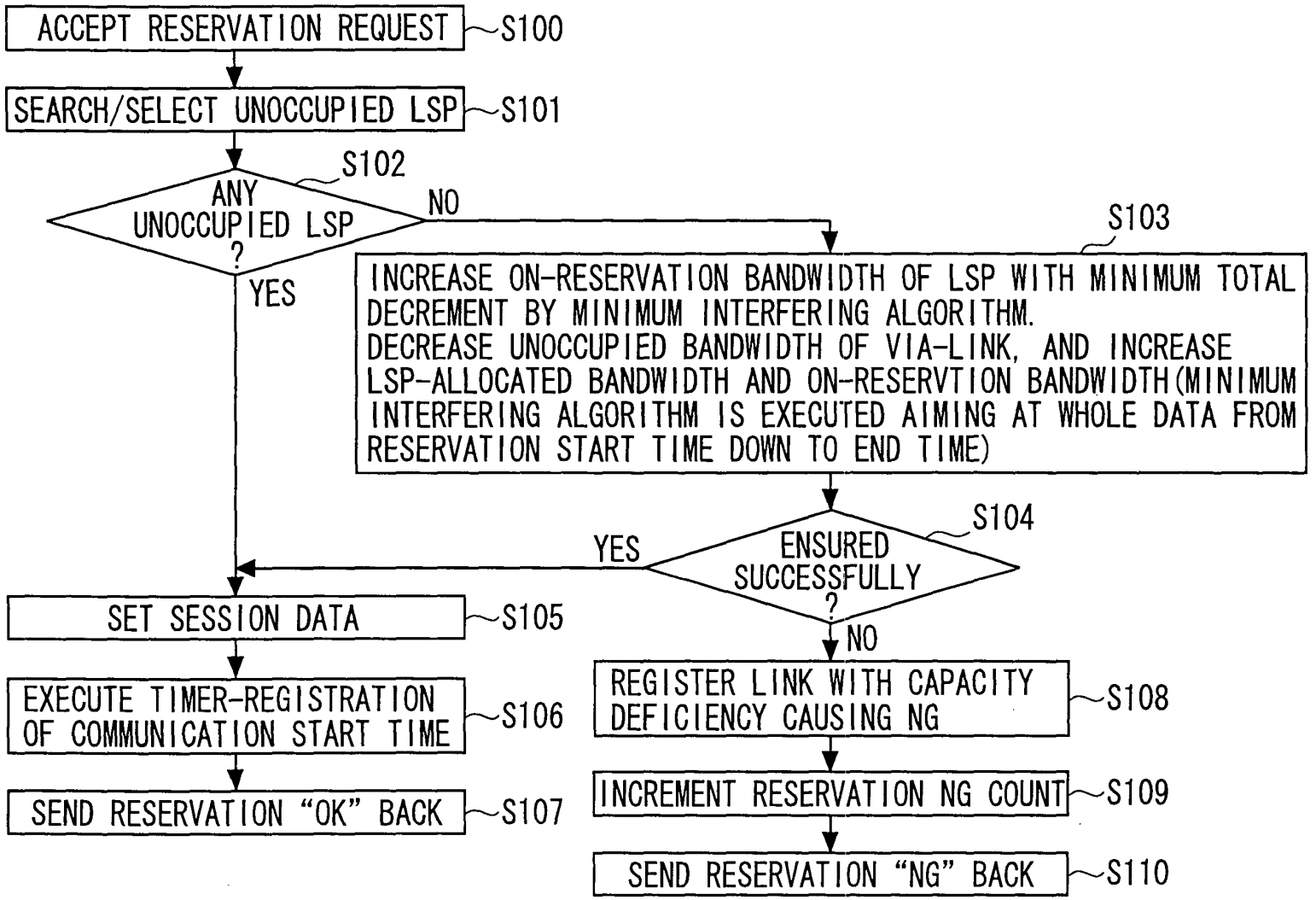

ACCEPT RESERVATION REQUEST
S100
SEARCH/SELECT UNOCCUPIED LSP
S101
S102
ANY UNOCCUPIED LSP ?
NO
YES
S103
INCREASE ON-RESERVATION BANDWIDTH OF LSP WITH MINIMUM TOTAL DECREMENT BY MINIMUM INTERFERING ALGORITHM.
DECREASE UNOCCUPIED BANDWIDTH OF VIA-LINK, AND INCREASE LSP-ALLOCATED BANDWIDTH AND ON-RESERVTION BANDWIDTH (MINIMUM INTERFERING ALGORITHM IS EXECUTED AIMING AT WHOLE DATA FROM RESERVATION START TIME DOWN TO END TIME)
S104
ENSURED SUCCESSFULLY ?
YES
NO
SET SESSION DATA
S105
EXECUTE TIMER-REGISTRATION OF COMMUNICATION START TIME
S106
SEND RESERVATION "OK" BACK
S107
REGISTER LINK WITH CAPACITY DEFICIENCY CAUSING NG
S108
INCREMENT RESERVATION NG COUNT
S109
SEND RESERVATION "NG" BACK
S110

FIG. 7

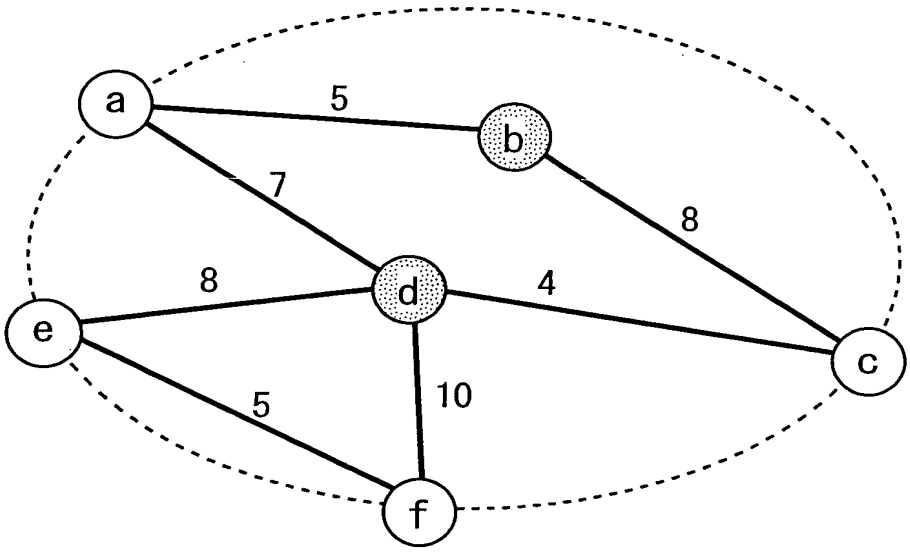


FIG. 8

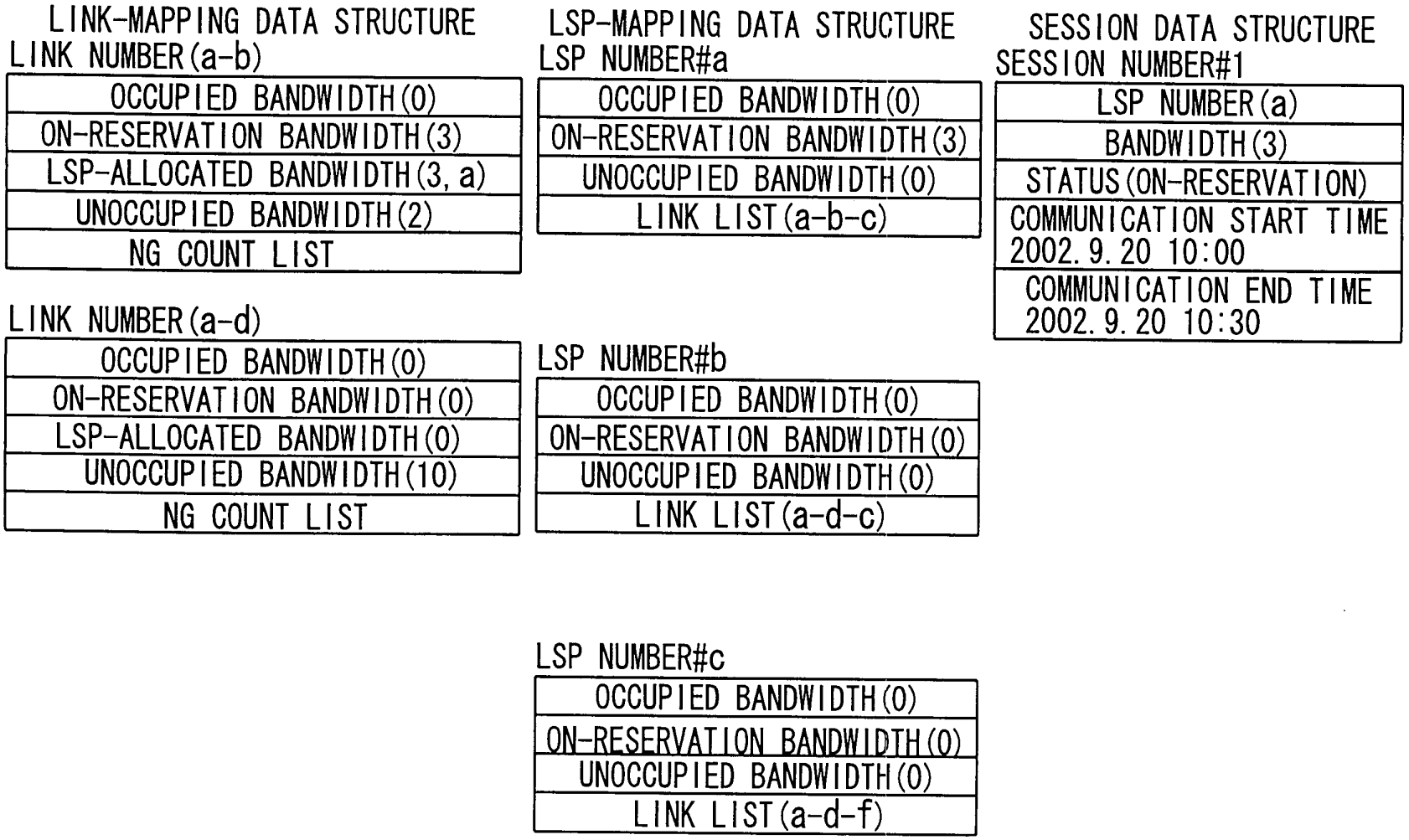

LINK-MAPPING DATA STRUCTURE
LINK NUMBER(a-b)
OCCUPIED BANDWIDTH(0)
ON-RESERVATION BANDWIDTH(3)
LSP-ALLOCATED BANDWIDTH(3,a)
UNOCCUPIED BANDWIDTH(2)
NG COUNT LIST
LINK NUMBER(a-d)
OCCUPIED BANDWIDTH(0)
ON-RESERVATION BANDWIDTH(0)
LSP-ALLOCATED BANDWIDTH(0)
UNOCCUPIED BANDWIDTH(10)
NG COUNT LIST
LSP-MAPPING DATA STRUCTURE
LSP NUMBER#a
OCCUPIED BANDWIDTH(0)
ON-RESERVATION BANDWIDTH(3)
UNOCCUPIED BANDWIDTH(0)
LINK LIST(a-b-c)
LSP NUMBER#b
OCCUPIED BANDWIDTH(0)
ON-RESERVATION BANDWIDTH(0)
UNOCCUPIED BANDWIDTH(0)
LINK LIST(a-d-c)
LSP NUMBER#c
OCCUPIED BANDWIDTH(0)
ON-RESERVATION BANDWIDTH(0)
UNOCCUPIED BANDWIDTH(0)
LINK LIST(a-d-f)
SESSION DATA STRUCTURE
SESSION NUMBER#1
LSP NUMBER(a)
BANDWIDTH(3)
STATUS(ON-RESERVATION)
COMMUNICATION START TIME
2002.9.20 10:00
COMMUNICATION END TIME
2002.9.20 10:30

FIG. 9

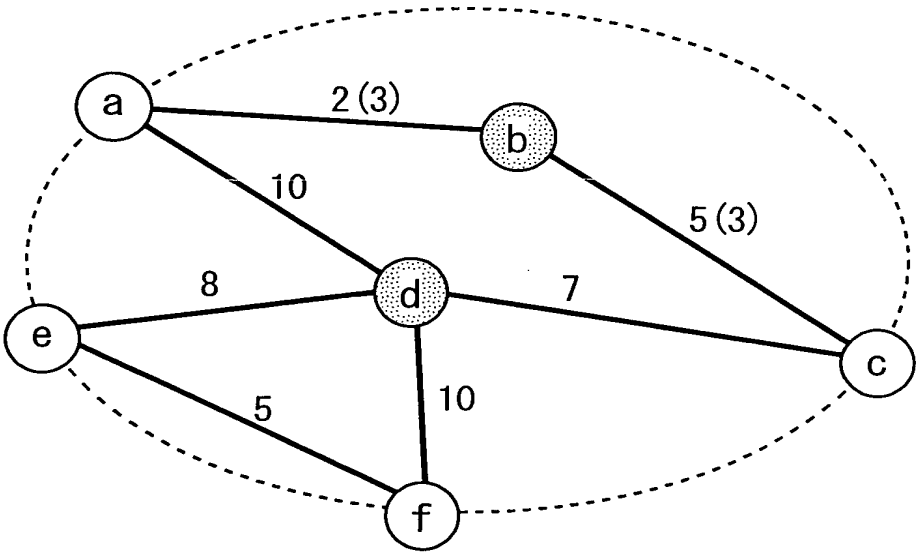


FIG. 10

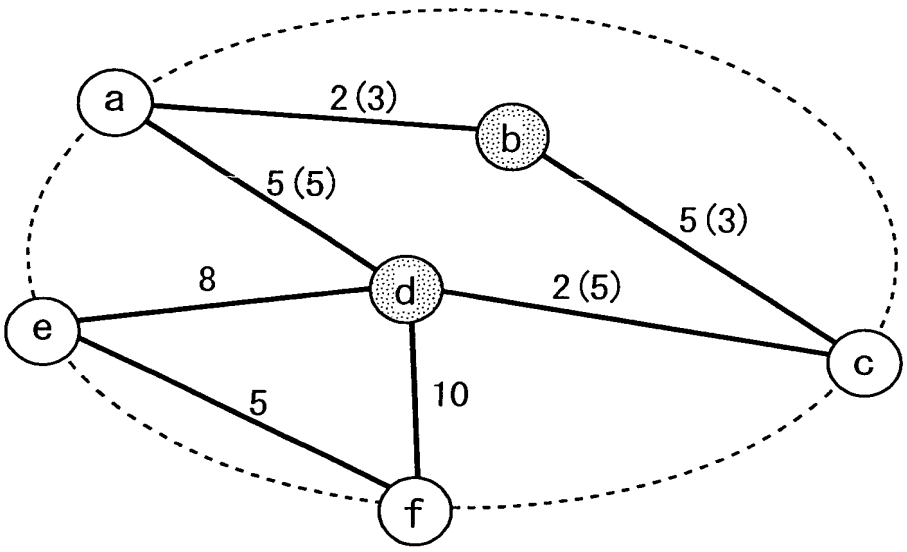


FIG. 11

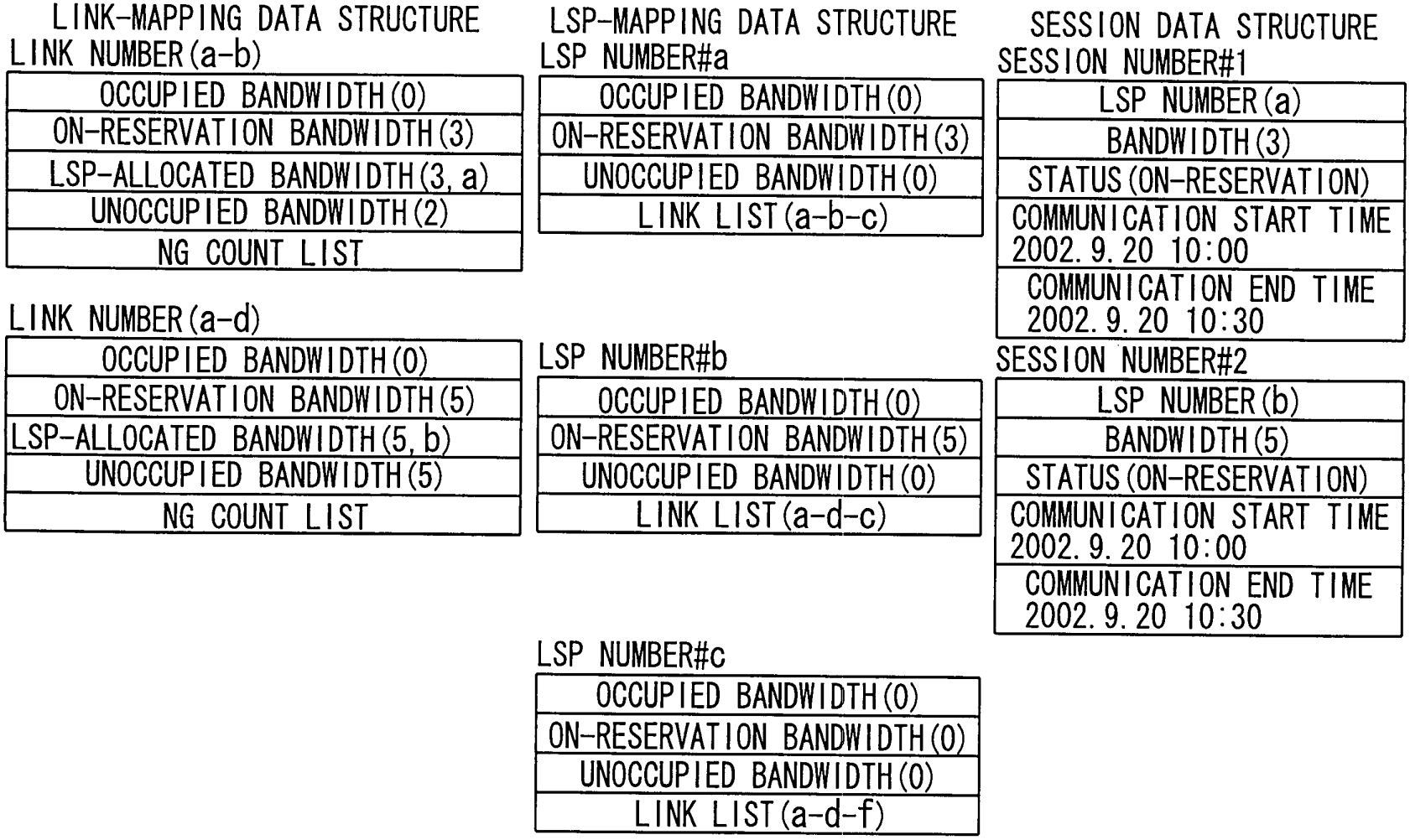
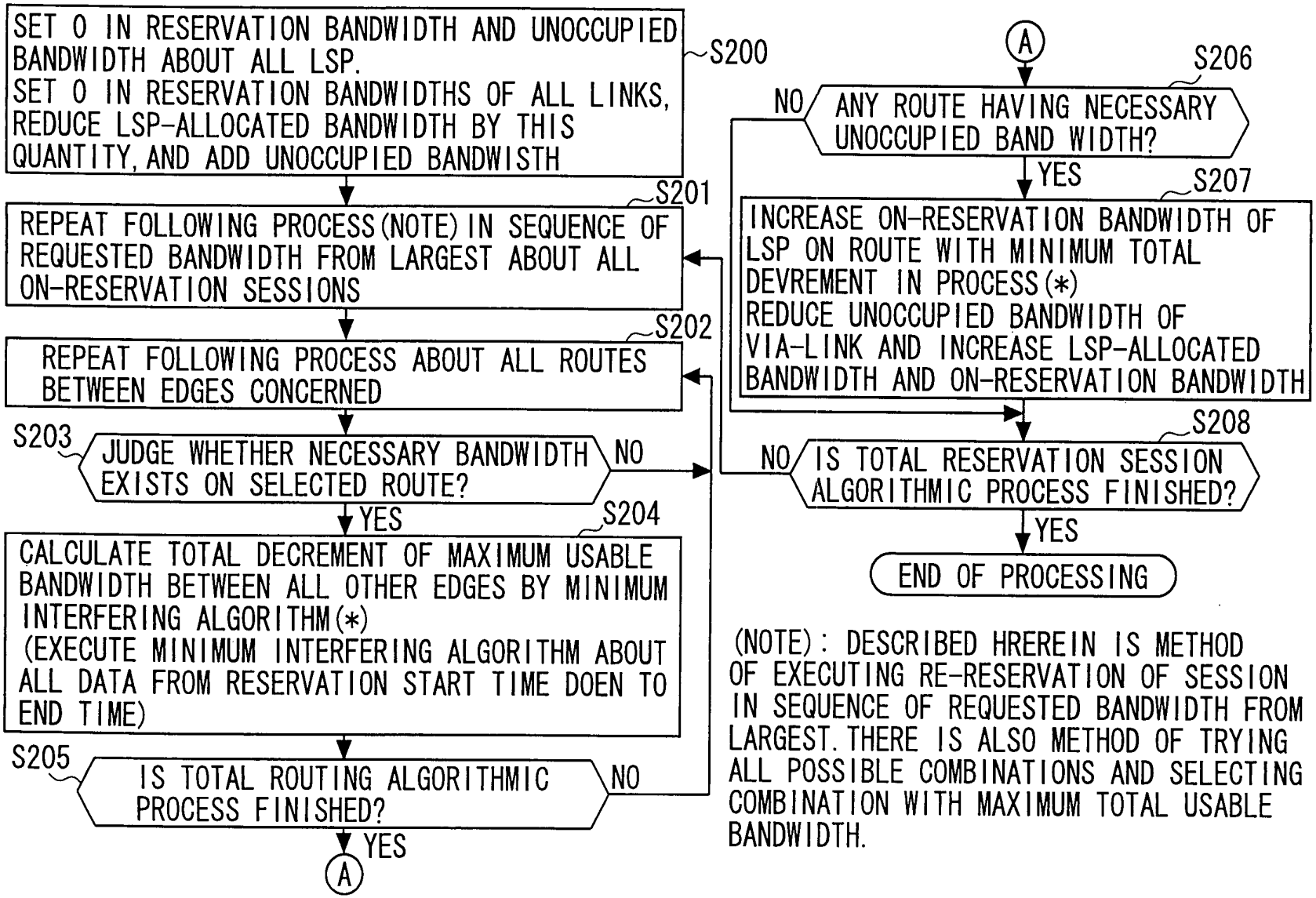

LINK-MAPPING DATA STRUCTURE
LINK NUMBER(a-b)
OCCUPIED BANDWIDTH(0)
ON-RESERVATION BANDWIDTH(3)
LSP-ALLOCATED BANDWIDTH(3,a)
UNOCCUPIED BANDWIDTH(2)
NG COUNT LIST
LINK NUMBER(a-d)
OCCUPIED BANDWIDTH(0)
ON-RESERVATION BANDWIDTH(5)
LSP-ALLOCATED BANDWIDTH(5,b)
UNOCCUPIED BANDWIDTH(5)
NG COUNT LIST
LSP-MAPPING DATA STRUCTURE
LSP NUMBER#a
OCCUPIED BANDWIDTH(0)
ON-RESERVATION BANDWIDTH(3)
UNOCCUPIED BANDWIDTH(0)
LINK LIST(a-b-c)
LSP NUMBER#b
OCCUPIED BANDWIDTH(0)
ON-RESERVATION BANDWIDTH(5)
UNOCCUPIED BANDWIDTH(0)
LINK LIST(a-d-c)
LSP NUMBER#c
OCCUPIED BANDWIDTH(0)
ON-RESERVATION BANDWIDTH(0)
UNOCCUPIED BANDWIDTH(0)
LINK LIST(a-d-f)
SESSION DATA STRUCTURE
SESSION NUMBER#1
LSP NUMBER(a)
BANDWIDTH(3)
STATUS(ON-RESERVATION)
COMMUNICATION START TIME
2002.9.20 10:00
COMMUNICATION END TIME
2002.9.20 10:30
SESSION NUMBER#2
LSP NUMBER(b)
BANDWIDTH(5)
STATUS(ON-RESERVATION)
COMMUNICATION START TIME
2002.9.20 10:00
COMMUNICATION END TIME
2002.9.20 10:30

FIG. 12



(NOTE): DESCRIBED HREREIN IS METHOD OF EXECUTING RE-RESERVATION OF SESSION IN SEQUENCE OF REQUESTED BANDWIDTH FROM LARGEST. THERE IS ALSO METHOD OF TRYING ALL POSSIBLE COMBINATIONS AND SELECTING COMBINATION WITH MAXIMUM TOTAL USABLE BANDWIDTH.

FIG. 13

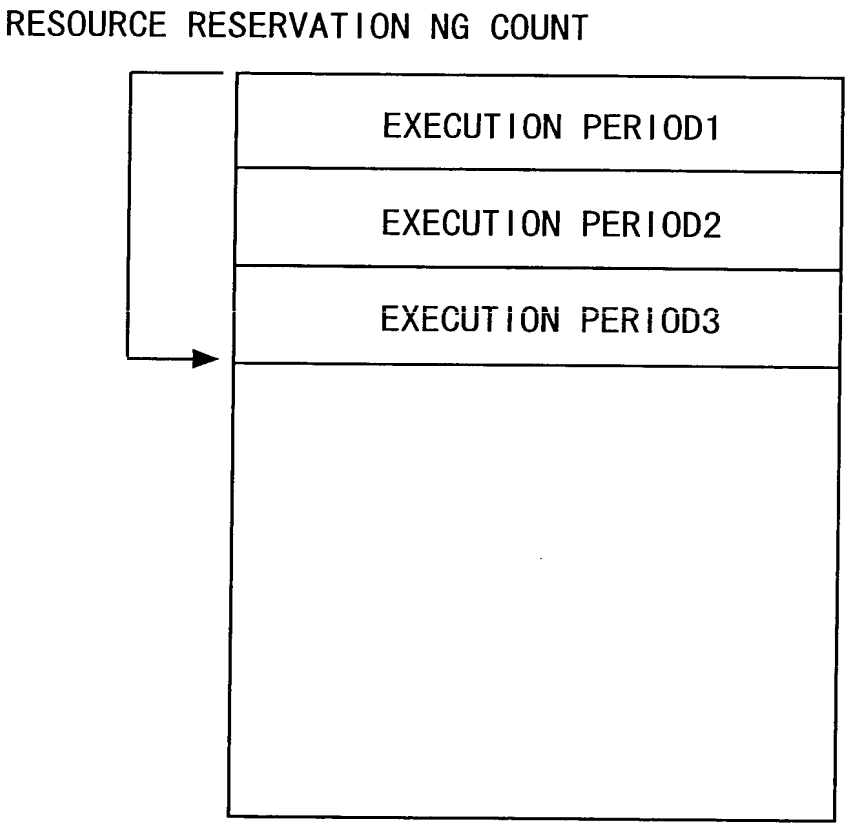

RESOURCE RESERVATION NG COUNT
EXECUTION PERIOD1
EXECUTION PERIOD2
EXECUTION PERIOD3

FIG. 14

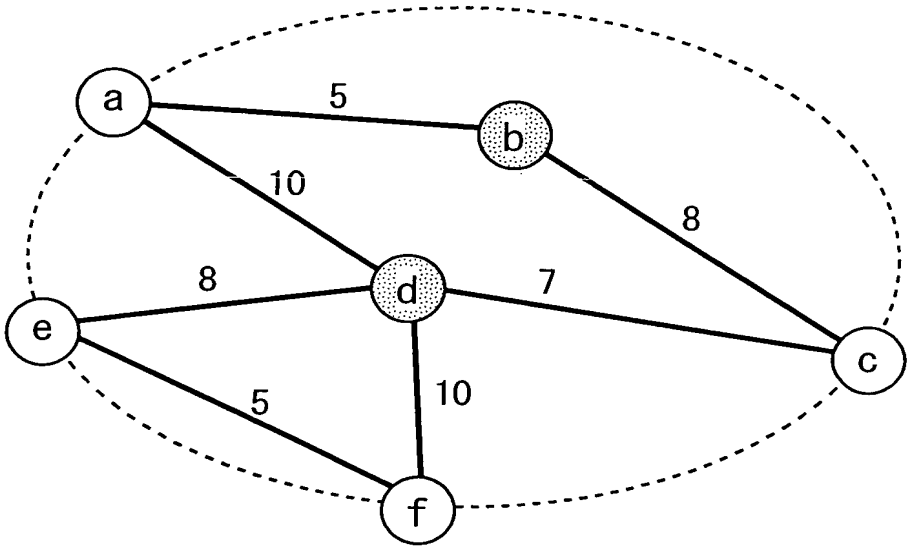


FIG. 15

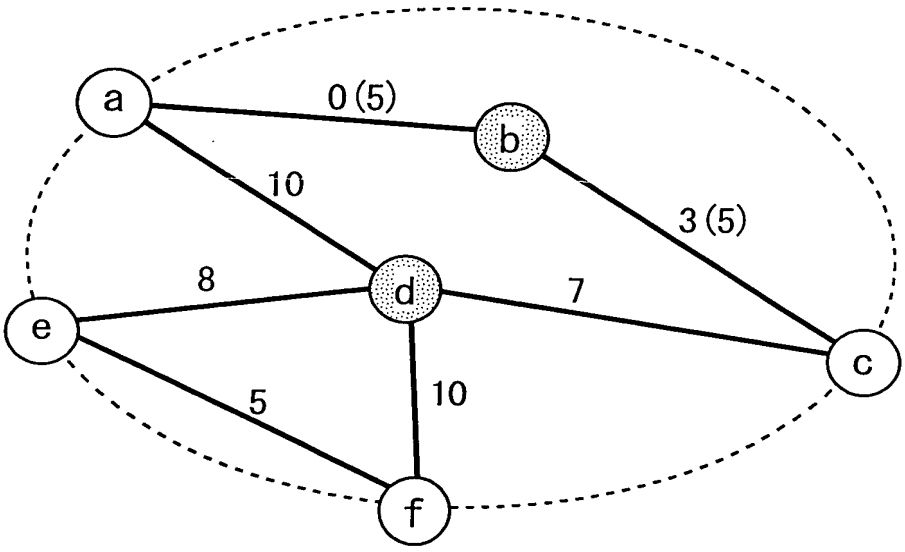


FIG. 16

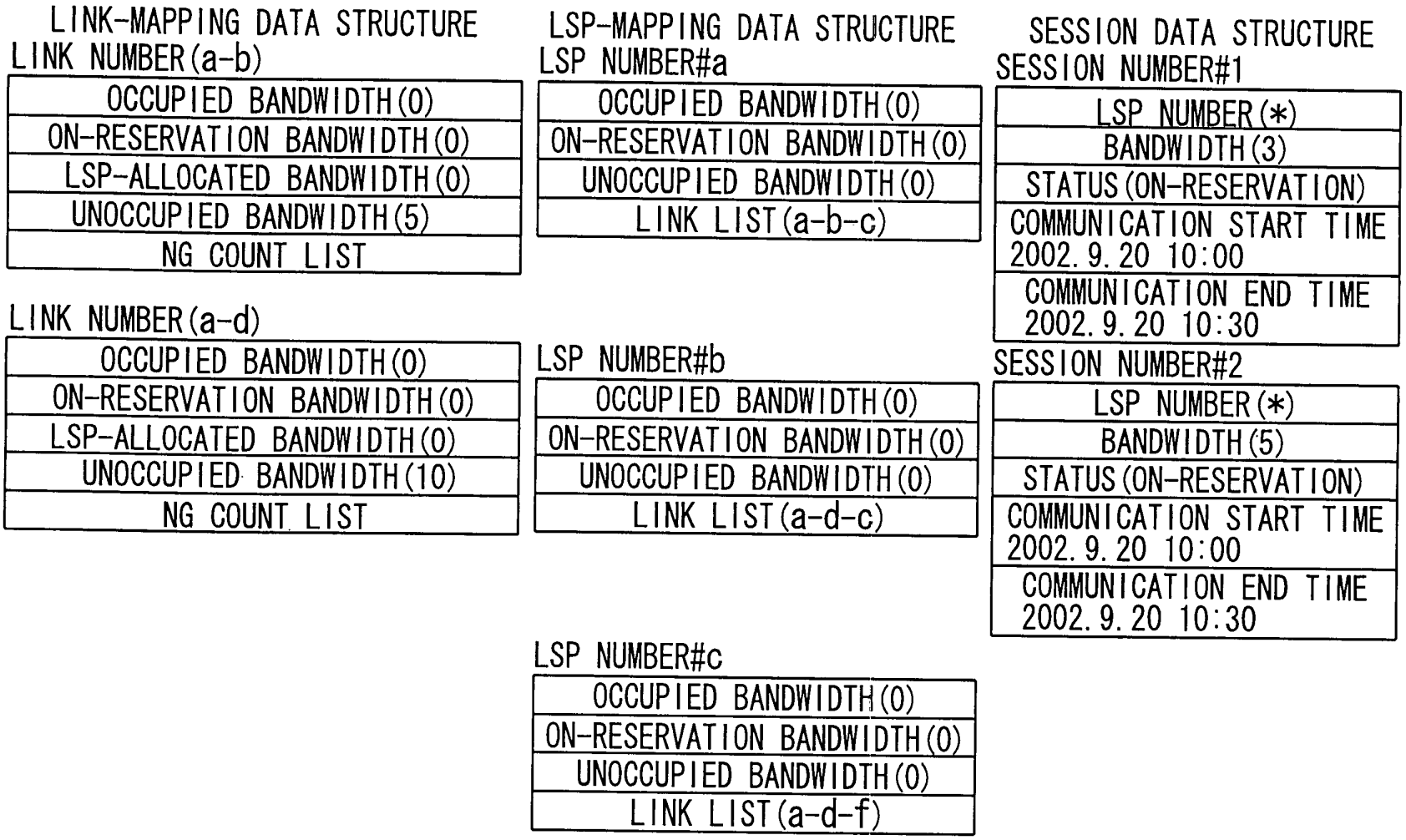

LINK-MAPPING DATA STRUCTURE
LINK NUMBER(a-b)
OCCUPIED BANDWIDTH(0)
ON-RESERVATION BANDWIDTH(0)
LSP-ALLOCATED BANDWIDTH(0)
UNOCCUPIED BANDWIDTH(5)
NG COUNT LIST
LINK NUMBER(a-d)
OCCUPIED BANDWIDTH(0)
ON-RESERVATION BANDWIDTH(0)
LSP-ALLOCATED BANDWIDTH(0)
UNOCCUPIED BANDWIDTH(10)
NG COUNT LIST
LSP-MAPPING DATA STRUCTURE
LSP NUMBER#a
OCCUPIED BANDWIDTH(0)
ON-RESERVATION BANDWIDTH(0)
UNOCCUPIED BANDWIDTH(0)
LINK LIST(a-b-c)
LSP NUMBER#b
OCCUPIED BANDWIDTH(0)
ON-RESERVATION BANDWIDTH(0)
UNOCCUPIED BANDWIDTH(0)
LINK LIST(a-d-c)
LSP NUMBER#c
OCCUPIED BANDWIDTH(0)
ON-RESERVATION BANDWIDTH(0)
UNOCCUPIED BANDWIDTH(0)
LINK LIST(a-d-f)
SESSION DATA STRUCTURE
SESSION NUMBER#1
LSP NUMBER(*)
BANDWIDTH(3)
STATUS(ON-RESERVATION)
COMMUNICATION START TIME
2002.9.20 10:00
COMMUNICATION END TIME
2002.9.20 10:30
SESSION NUMBER#2
LSP NUMBER(*)
BANDWIDTH(5)
STATUS(ON-RESERVATION)
COMMUNICATION START TIME
2002.9.20 10:00
COMMUNICATION END TIME
2002.9.20 10:30

FIG. 17

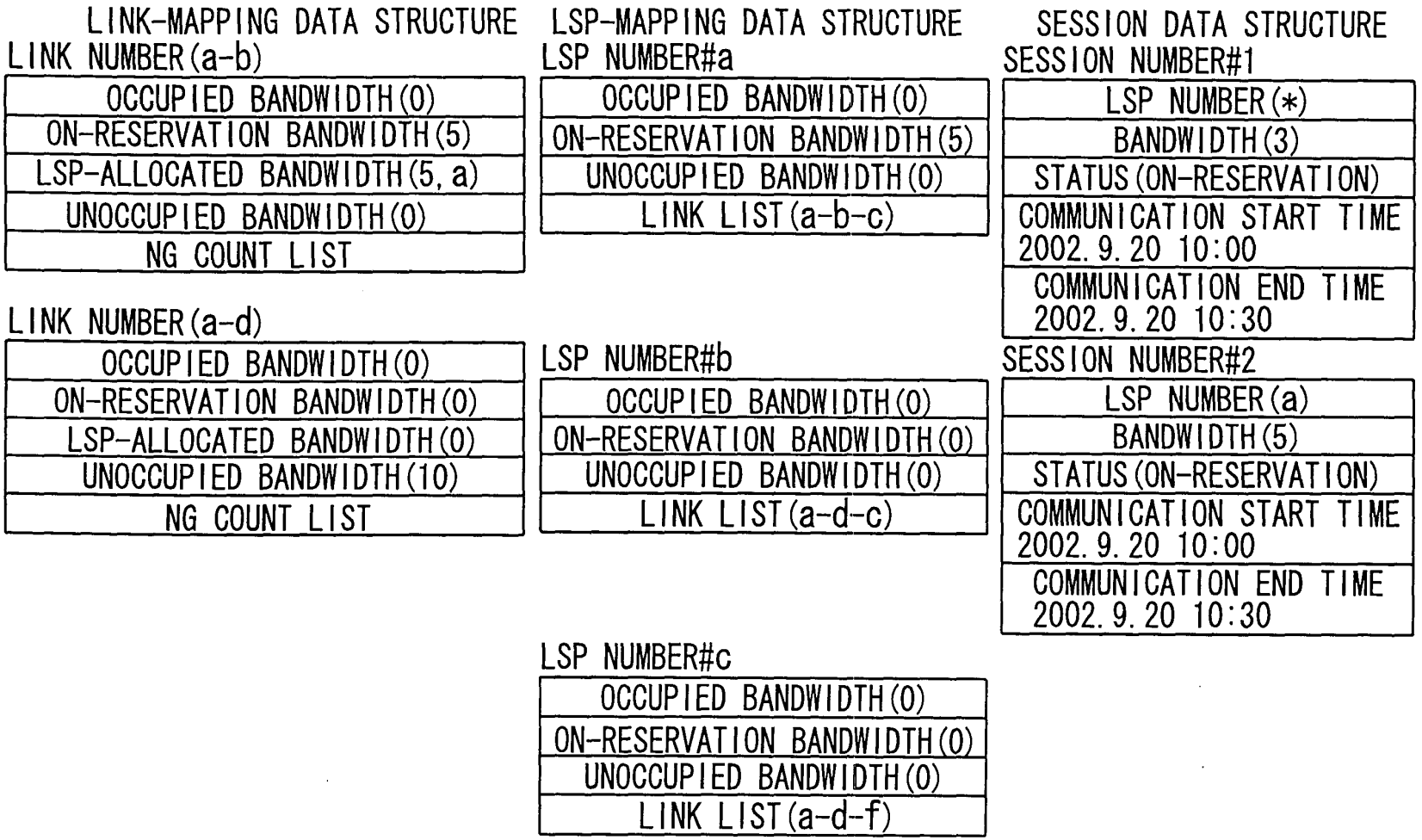

LINK-MAPPING DATA STRUCTURE
LINK NUMBER(a-b)
OCCUPIED BANDWIDTH(0)
ON-RESERVATION BANDWIDTH(5)
LSP-ALLOCATED BANDWIDTH(5, a)
UNOCCUPIED BANDWIDTH(0)
NG COUNT LIST
LINK NUMBER(a-d)
OCCUPIED BANDWIDTH(0)
ON-RESERVATION BANDWIDTH(0)
LSP-ALLOCATED BANDWIDTH(0)
UNOCCUPIED BANDWIDTH(10)
NG COUNT LIST
LSP-MAPPING DATA STRUCTURE
LSP NUMBER#a
OCCUPIED BANDWIDTH(0)
ON-RESERVATION BANDWIDTH(5)
UNOCCUPIED BANDWIDTH(0)
LINK LIST(a-b-c)
LSP NUMBER#b
OCCUPIED BANDWIDTH(0)
ON-RESERVATION BANDWIDTH(0)
UNOCCUPIED BANDWIDTH(0)
LINK LIST(a-d-c)
LSP NUMBER#c
OCCUPIED BANDWIDTH(0)
ON-RESERVATION BANDWIDTH(0)
UNOCCUPIED BANDWIDTH(0)
LINK LIST(a-d-f)
SESSION DATA STRUCTURE
SESSION NUMBER#1
LSP NUMBER(*)
BANDWIDTH(3)
STATUS(ON-RESERVATION)
COMMUNICATION START TIME
2002.9.20 10:00
COMMUNICATION END TIME
2002.9.20 10:30
SESSION NUMBER#2
LSP NUMBER(a)
BANDWIDTH(5)
STATUS(ON-RESERVATION)
COMMUNICATION START TIME
2002.9.20 10:00
COMMUNICATION END TIME
2002.9.20 10:30

FIG. 18

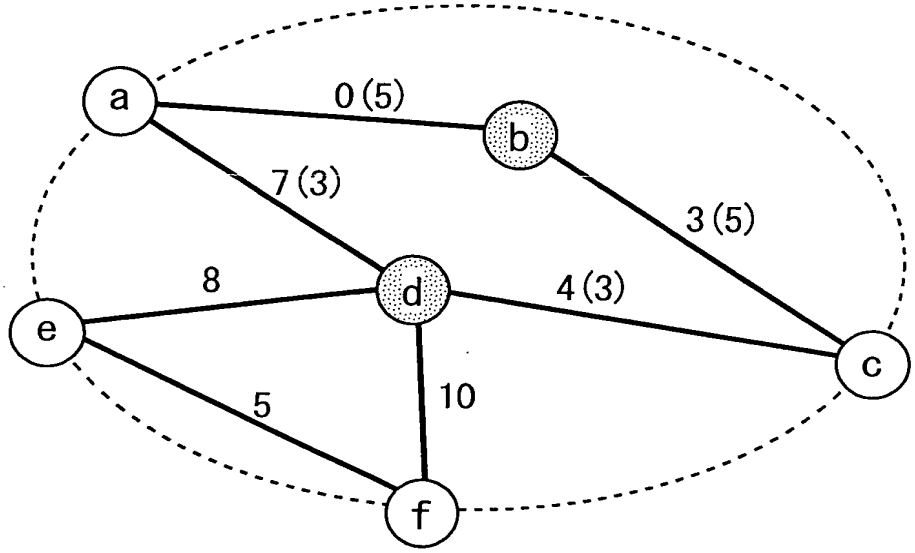


FIG. 19

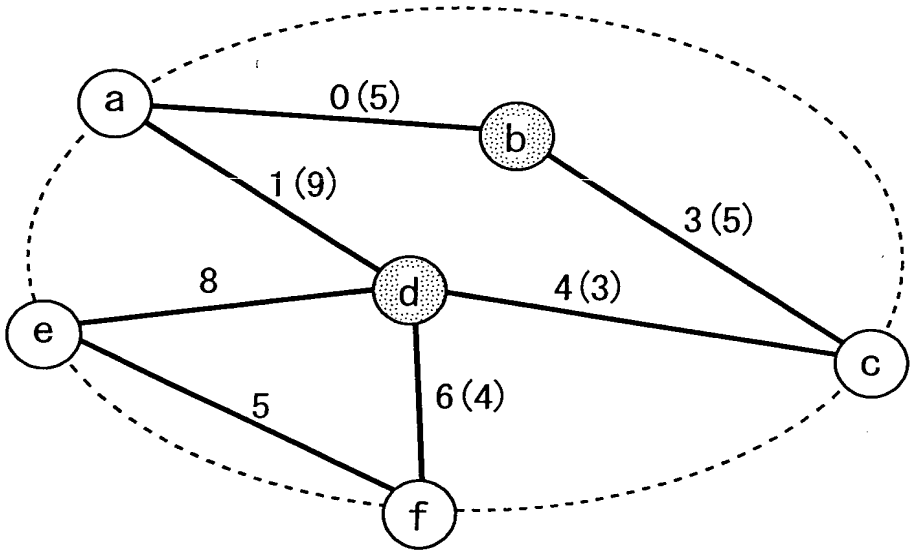


FIG. 20

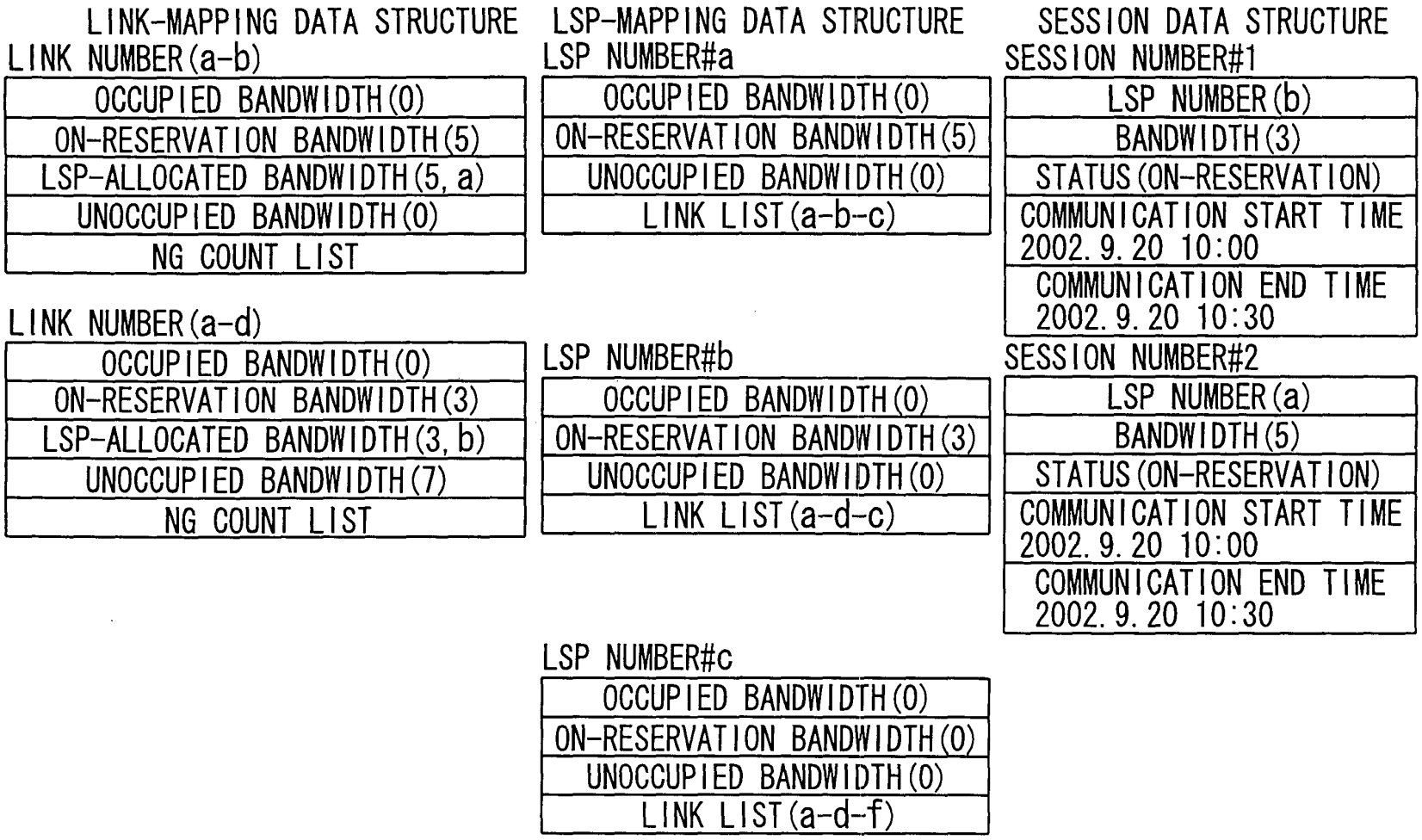

LINK-MAPPING DATA STRUCTURE
LINK NUMBER(a-b)
OCCUPIED BANDWIDTH(0)
ON-RESERVATION BANDWIDTH(5)
LSP-ALLOCATED BANDWIDTH(5, a)
UNOCCUPIED BANDWIDTH(0)
NG COUNT LIST
LINK NUMBER(a-d)
OCCUPIED BANDWIDTH(0)
ON-RESERVATION BANDWIDTH(3)
LSP-ALLOCATED BANDWIDTH(3, b)
UNOCCUPIED BANDWIDTH(7)
NG COUNT LIST
LSP-MAPPING DATA STRUCTURE
LSP NUMBER#a
OCCUPIED BANDWIDTH(0)
ON-RESERVATION BANDWIDTH(5)
UNOCCUPIED BANDWIDTH(0)
LINK LIST(a-b-c)
LSP NUMBER#b
OCCUPIED BANDWIDTH(0)
ON-RESERVATION BANDWIDTH(3)
UNOCCUPIED BANDWIDTH(0)
LINK LIST(a-d-c)
LSP NUMBER#c
OCCUPIED BANDWIDTH(0)
ON-RESERVATION BANDWIDTH(0)
UNOCCUPIED BANDWIDTH(0)
LINK LIST(a-d-f)
SESSION DATA STRUCTURE
SESSION NUMBER#1
LSP NUMBER(b)
BANDWIDTH(3)
STATUS(ON-RESERVATION)
COMMUNICATION START TIME
2002. 9. 20 10:00
COMMUNICATION END TIME
2002. 9. 20 10:30
SESSION NUMBER#2
LSP NUMBER(a)
BANDWIDTH(5)
STATUS(ON-RESERVATION)
COMMUNICATION START TIME
2002. 9. 20 10:00
COMMUNICATION END TIME
2002. 9. 20 10:30

FIG. 21

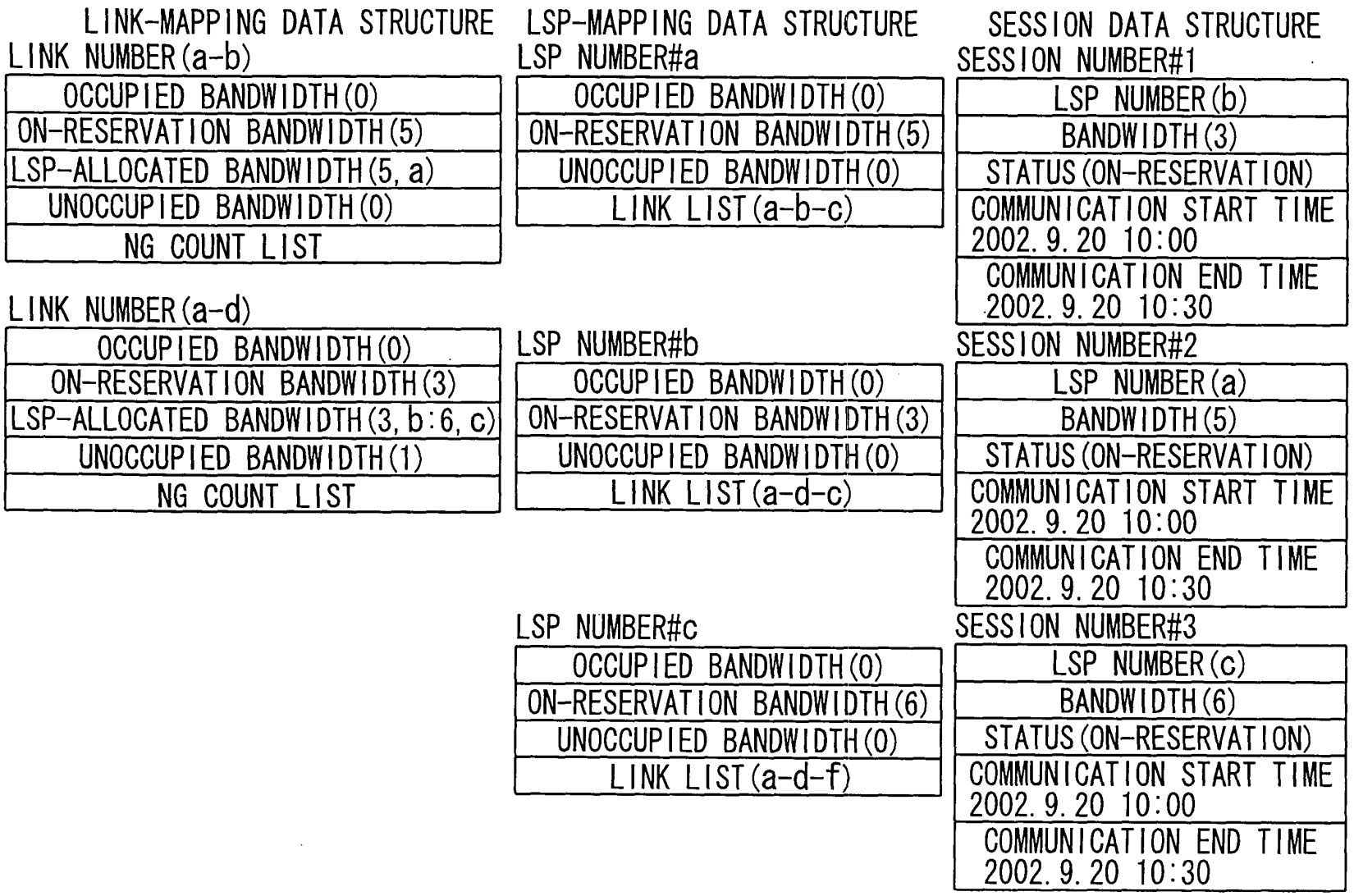

LINK-MAPPING DATA STRUCTURE
LINK NUMBER(a-b)
OCCUPIED BANDWIDTH(0)
ON-RESERVATION BANDWIDTH(5)
LSP-ALLOCATED BANDWIDTH(5, a)
UNOCCUPIED BANDWIDTH(0)
NG COUNT LIST
LINK NUMBER(a-d)
OCCUPIED BANDWIDTH(0)
ON-RESERVATION BANDWIDTH(3)
LSP-ALLOCATED BANDWIDTH(3, b:6, c)
UNOCCUPIED BANDWIDTH(1)
NG COUNT LIST
LSP-MAPPING DATA STRUCTURE
LSP NUMBER#a
OCCUPIED BANDWIDTH(0)
ON-RESERVATION BANDWIDTH(5)
UNOCCUPIED BANDWIDTH(0)
LINK LIST(a-b-c)
LSP NUMBER#b
OCCUPIED BANDWIDTH(0)
ON-RESERVATION BANDWIDTH(3)
UNOCCUPIED BANDWIDTH(0)
LINK LIST(a-d-c)
LSP NUMBER#c
OCCUPIED BANDWIDTH(0)
ON-RESERVATION BANDWIDTH(6)
UNOCCUPIED BANDWIDTH(0)
LINK LIST(a-d-f)
SESSION DATA STRUCTURE
SESSION NUMBER#1
LSP NUMBER(b)
BANDWIDTH(3)
STATUS(ON-RESERVATION)
COMMUNICATION START TIME
2002.9.20 10:00
COMMUNICATION END TIME
2002.9.20 10:30
SESSION NUMBER#2
LSP NUMBER(a)
BANDWIDTH(5)
STATUS(ON-RESERVATION)
COMMUNICATION START TIME
2002.9.20 10:00
COMMUNICATION END TIME
2002.9.20 10:30
SESSION NUMBER#3
LSP NUMBER(c)
BANDWIDTH(6)
STATUS(ON-RESERVATION)
COMMUNICATION START TIME
2002.9.20 10:00
COMMUNICATION END TIME
2002.9.20 10:30

FIG. 22

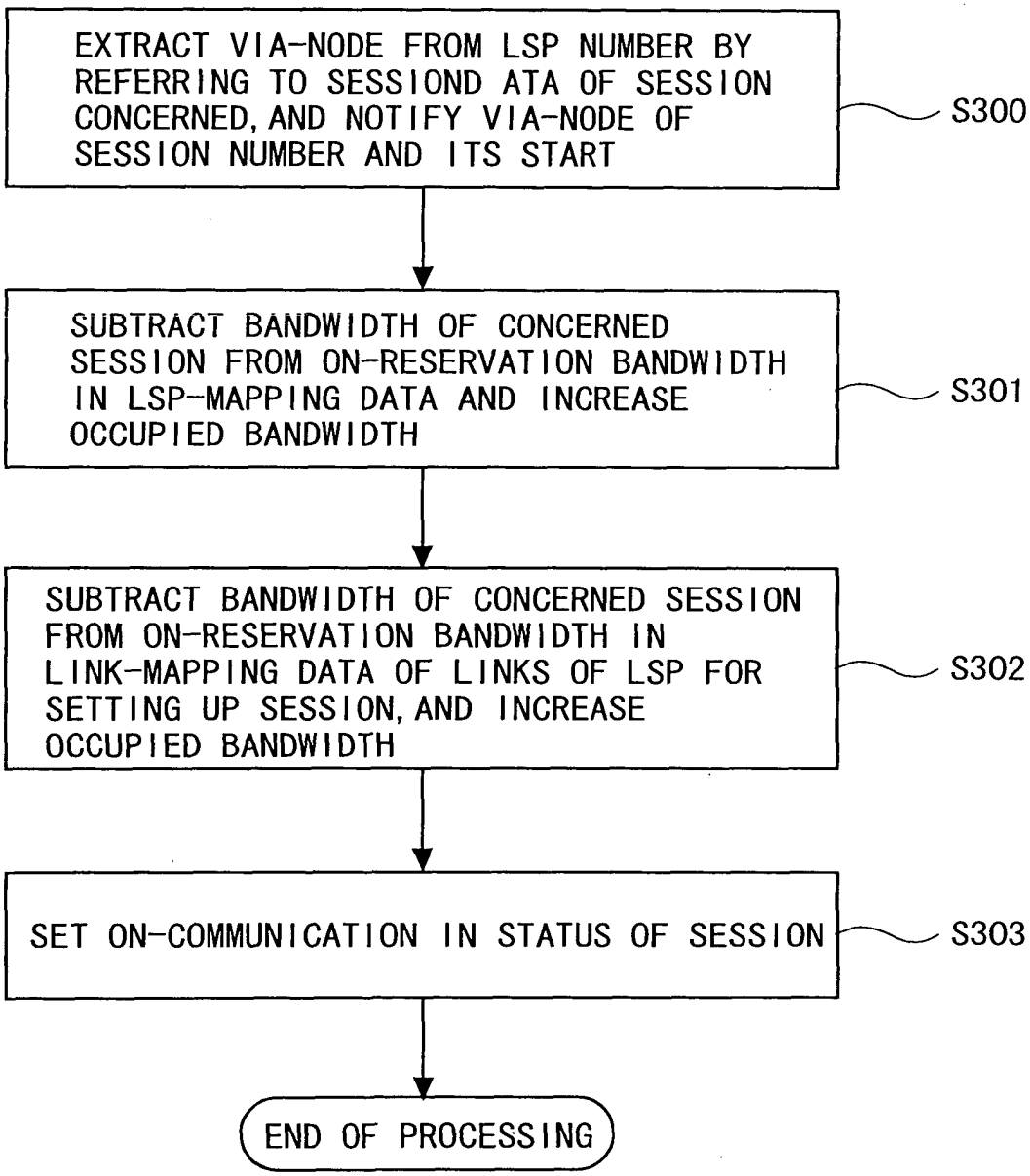

EXTRACT VIA-NODE FROM LSP NUMBER BY REFERRING TO SESSIOND ATA OF SESSION CONCERNED, AND NOTIFY VIA-NODE OF SESSION NUMBER AND ITS START
S300
SUBTRACT BANDWIDTH OF CONCERNED SESSION FROM ON-RESERVATION BANDWIDTH IN LSP-MAPPING DATA AND INCREASE OCCUPIED BANDWIDTH
S301
SUBTRACT BANDWIDTH OF CONCERNED SESSION FROM ON-RESERVATION BANDWIDTH IN LINK-MAPPING DATA OF LINKS OF LSP FOR SETTING UP SESSION, AND INCREASE OCCUPIED BANDWIDTH
S302
SET ON-COMMUNICATION IN STATUS OF SESSION
S303
END OF PROCESSING

FIG. 23

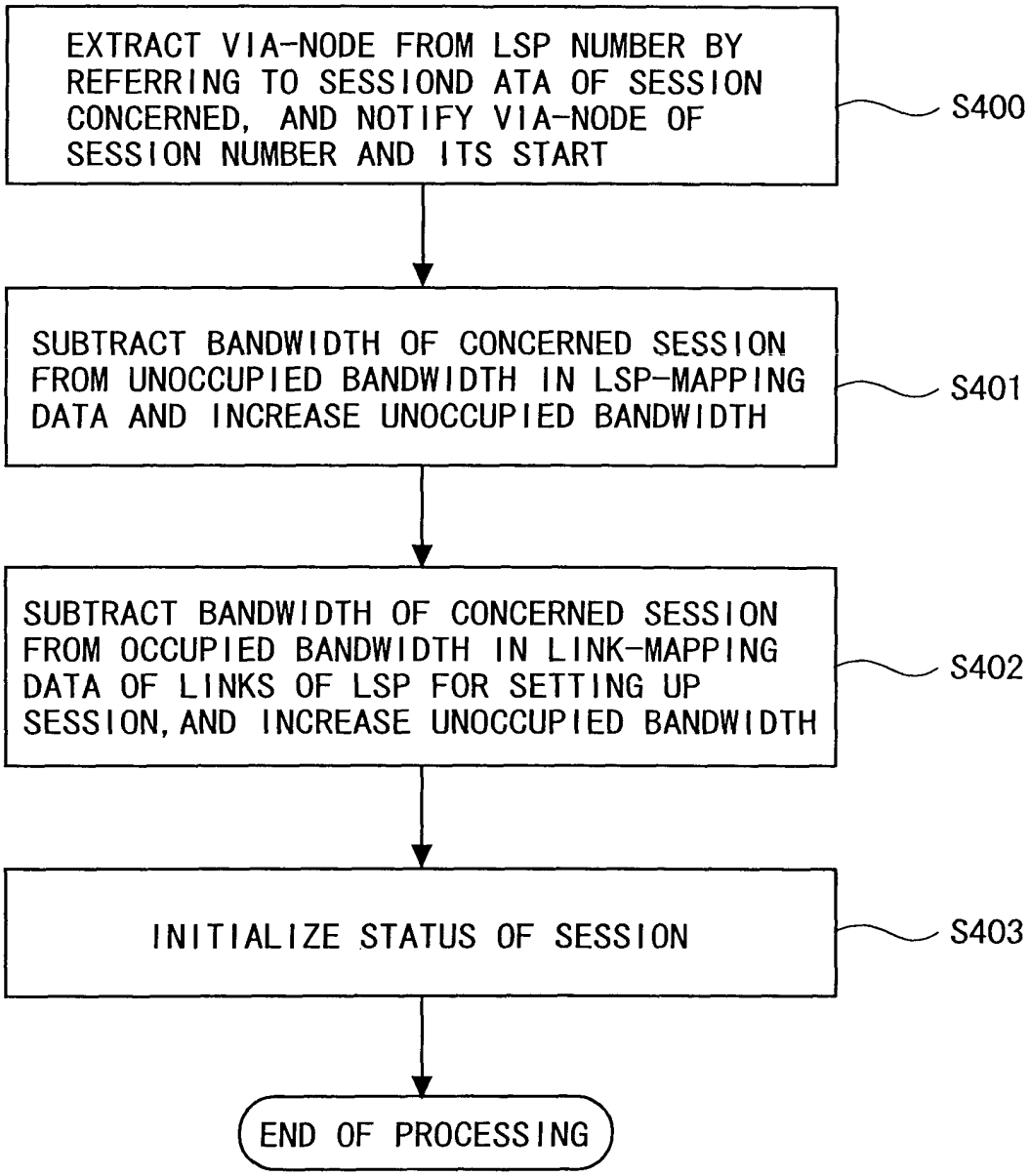

EXTRACT VIA-NODE FROM LSP NUMBER BY REFERRING TO SESSIOND ATA OF SESSION CONCERNED, AND NOTIFY VIA-NODE OF SESSION NUMBER AND ITS START
S400
SUBTRACT BANDWIDTH OF CONCERNED SESSION FROM UNOCCUPIED BANDWIDTH IN LSP-MAPPING DATA AND INCREASE UNOCCUPIED BANDWIDTH
S401
SUBTRACT BANDWIDTH OF CONCERNED SESSION FROM OCCUPIED BANDWIDTH IN LINK-MAPPING DATA OF LINKS OF LSP FOR SETTING UP SESSION, AND INCREASE UNOCCUPIED BANDWIDTH
S402
INITIALIZE STATUS OF SESSION
S403
END OF PROCESSING

FIG. 24

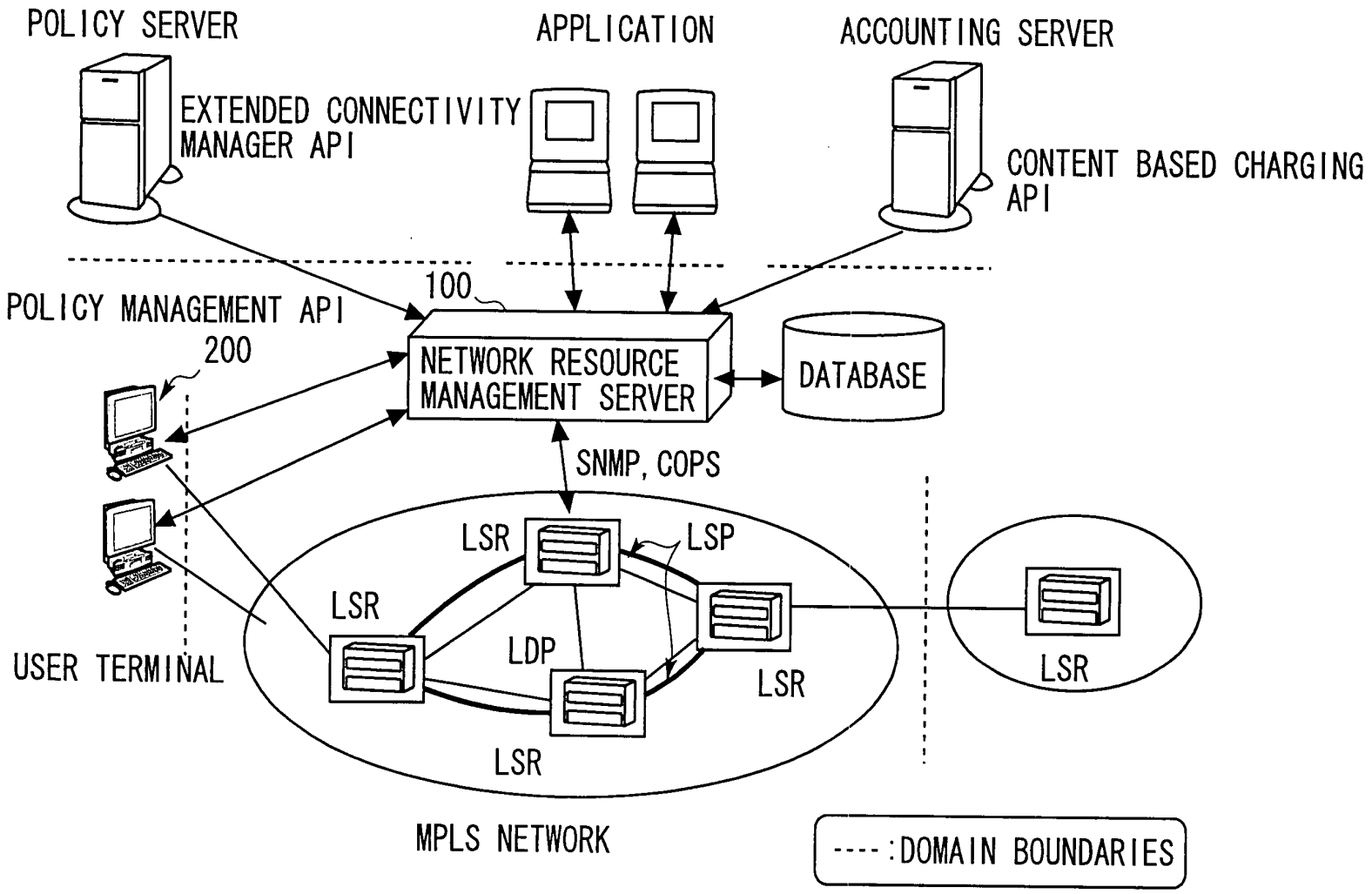

POLICY SERVER
APPLICATION
ACCOUNTING SERVER
EXTENDED CONNECTIVITY MANAGER API
CONTENT BASED CHARGING API
100
POLICY MANAGEMENT API
200
NETWORK RESOURCE MANAGEMENT SERVER
DATABASE
SNMP, COPS
LSR
LSP
LSR
LDP
LSR
LSR
LSR
USER TERMINAL
MPLS NETWORK
----:DOMAIN BOUNDARIES

FIG. 25

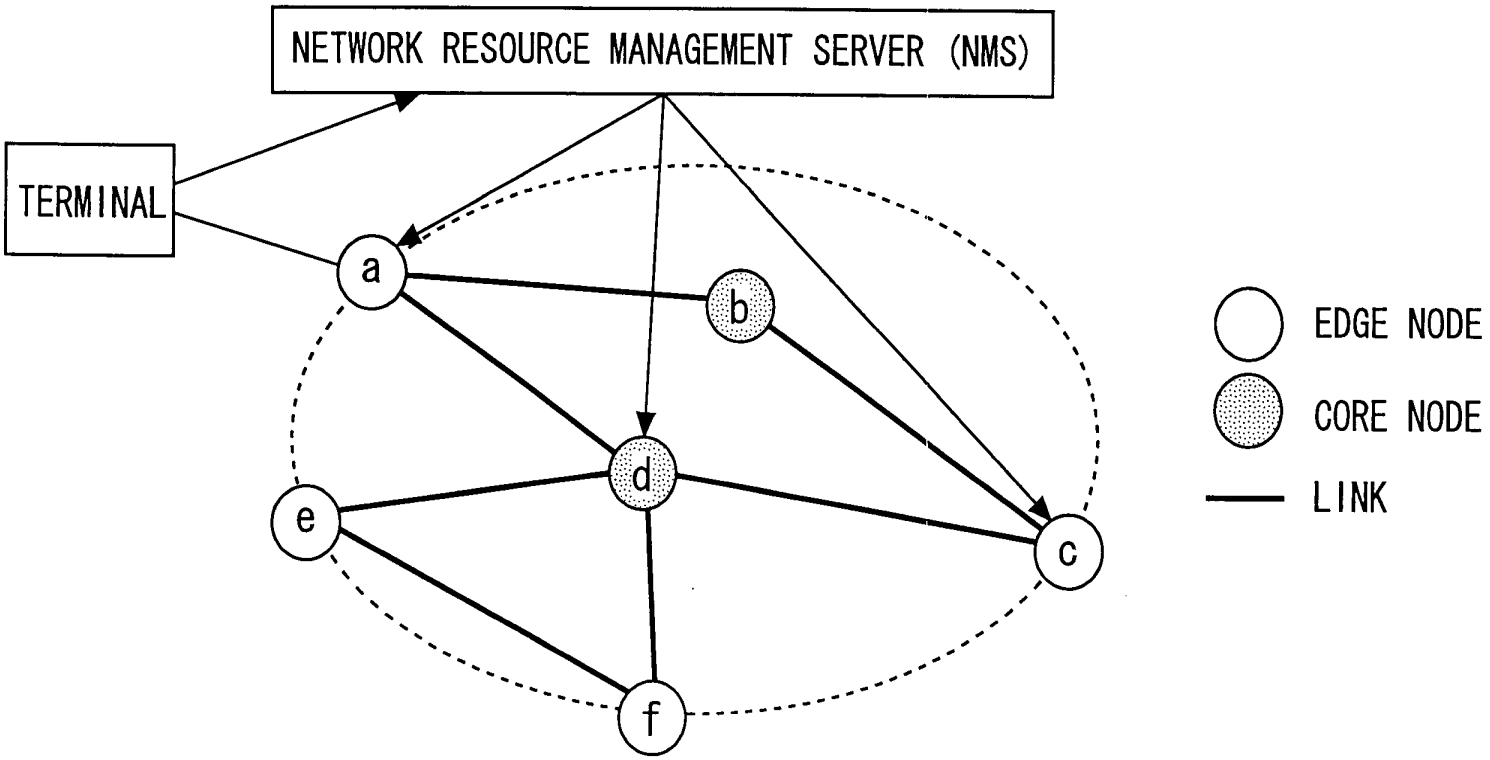

NETWORK RESOURCE MANAGEMENT SERVER (NMS)
TERMINAL
a
b
d
e
c
f
EDGE NODE
CORE NODE
LINK

FIG. 26

CONVENTIONAL METHOD

ENSURE LSP CAPACITY ACCORDING TO NECESSITY	→	IF NOT ENSURED, RELEASE AND RE-SET UNUSED BANDWIDTHS OF LSPs

THIS IS EXTENDED UNDER FOLLOWING CONDITIONS.

LSP USED BY ON-COMMUNICATION SESSION CAN NOT BE CHANGED.
LSP USED BY ON-RESERVATION SESSION CAN NOT BE CHANGED.

ENSURE LSP CAPACITY ACCORDING TO NECESSITY	→	IF NOT ENSURED, TENTATIVELY RELEASE AND RE-SET UNUSED BANDWIDTHS OF LSPs AND BANDWIDTHS OF ON-RESERVATION SESSIONS

INCREASE WEIGHT OF ROUTE WITH BANDWIDTH THAT COULD NOT BE ENSURED BY MINIMUM INTERFERING ALGORITHM WHEN RE-SETTING.
PERIODICALLY EXECUTE RE-SETTING.

THIS PROCESS ENABLES BOTH OF MINIMIZATION OD DELAY OF PROCESSING AND PREVENTION OF INCREASE IN PROCESSING LOAD.

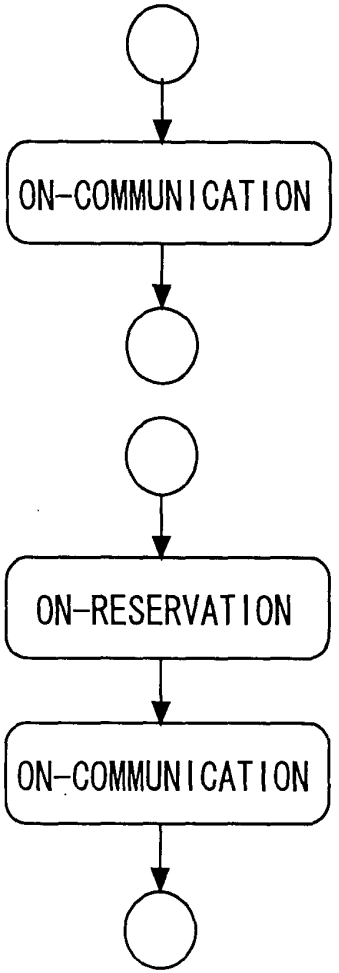
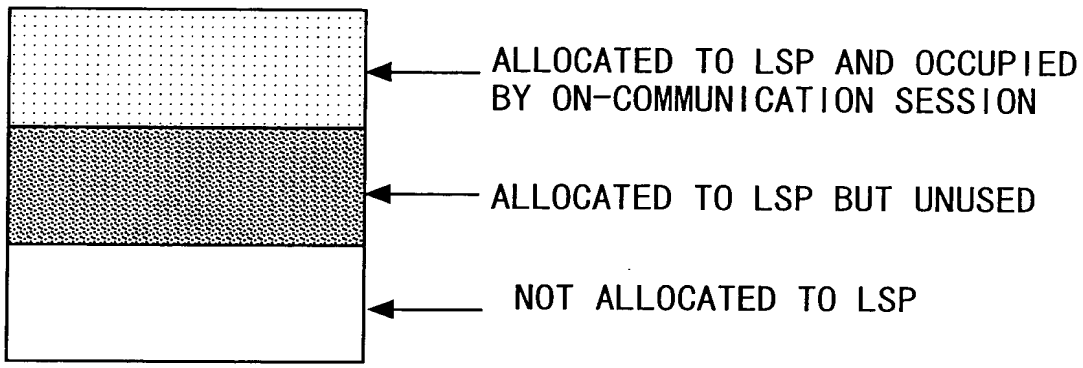
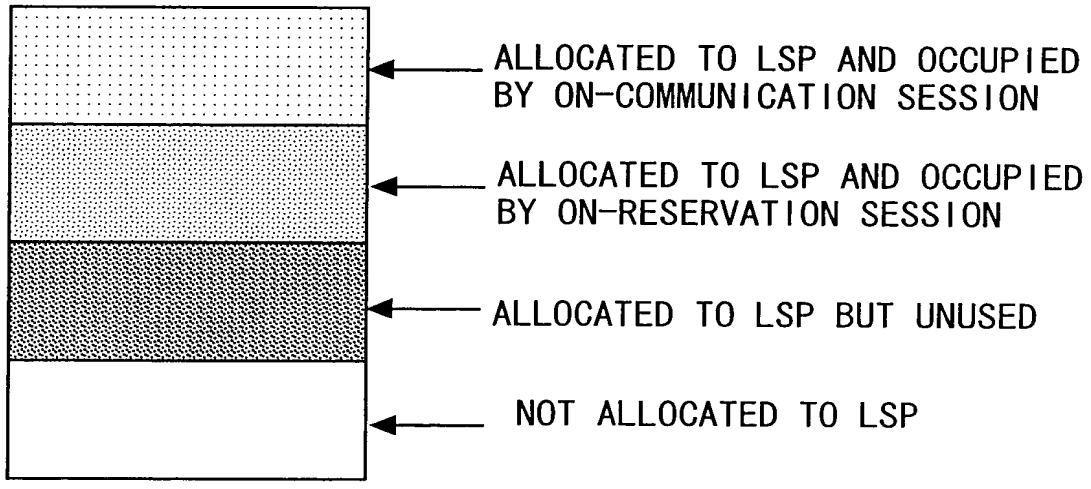


FIG. 27



PRIOR ART



RESERVATION SERVICE TAKEN INTO CONSIDERATION